The Genus *Seila* A. Adams, 1861 (Mollusca, Gastropoda, Cerithiopsidae) in the Atlantic Ocean

E. Rolán
C. Castillo, 22, 36202, Vigo, España

and

F. Fernandes
c.p. 1038, Luanda, Republica Popular de Angola

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PLABRAS CLAVE: Gastropoda, Cerithiopsidae, *Seila*, nuevas especies, Océano Atlántico.

RESUMEN. Se comentan los taxones existentes para las especies del género *Seila* A. Adams, 1861 del Océano Atlántico tanto Oriental como Occidental. Los taxones *S. trilineata* (Philippi, 1836), *S. adamsi* (H. C. Lea, 1845) y *S. carinata* (E. A. Smith, 1871), que frecuentemente han sido sinonimizados, son considerados válidos después de la aportación de nueva información y de la comparación de todos los datos conocidos. Se describen, además, cinco especies nuevas en base a las diferencias con las especies ya conocidas siendo las más importantes las observadas en las vueltas embrionarias: *Seila angolensis* n. sp., con tres vueltas y media, tubérculos en la primera y sutura profunda con una estría, *S. parilis* n. sp., más ancha, con dos vueltas, sutura simple y tubérculos en la primera, *S. inchoata* n. sp. con dos vueltas y un cuarto, lisas y con una excavación subsutural, *S. deaurata* n. sp., con dos vueltas, lisas, con un ángulo periférico marcado, y *S. carquejai* n. sp., con dos vueltas y media, lisas, excavación subsutural y núcleo irregular.

SUMMARY. The taxa of the genus *Seila* A. Adams, 1861 from the eastern and the western Atlantic are mentioned. The taxa *S. trilineata* (Philippi, 1836), *S. adamsi* (H. C. Lea, 1845) and *S. carinata* (E. A. Smith, 1871), which have been frequently synonymized, are considered valid. Five new species are described (*Seila angolensis* n. sp., *S. parilis* n. sp., *S. inchoata* n. sp., *S. deaurata* n. sp. and *S. carquejai* n. sp.) based on their differences from the known species, especially in the embryonic whorls.

fig. 1. *Seila. carinata* (E. A. Smith, 1871). Holotype (BMNH).
fig. 2. *S. adamsi* (H. C. Lea, 1845). (CER). Specimen of Cayo Cantiles -2 m. Cuba.
fig. 3. *S. angolensis* n. sp. Paratype (CER). Corimba (Luanda) -20 m. Angola.
fig. 4. *S. angolensis* n. sp. (CER). Buraco. (South Luanda) -4 m. Angola.
fig. 5. *S. deaurata* n. sp. Holotype (MCNM). Luanda -60 m. (Angola).
fig. 6. *S.* cf. *angolensis.* (CER). Baía de Santa Maria, Intertidal. Angola.
fig. 7. *S. carquejai* n. sp. Paratype (CER). Baía das Pipas. Intertidal. South of Angola.
fig. 8. *S. inchoata* n. sp. Holotype (MCNM). Porto Mindelo -8 m. Republica de Cabo Verde.
fig. 9. *S. parilis* n. sp. Paratype (CFF). Esprainha -3 m. Sâo Tome.
fig. 10. Radula of *S. parilis* n. sp.
fig. 11. Radula of *S. angolensis* n. sp.

(Scale bar: shells: 1 mm; radulae: 0,02 mm)

INTRODUCTION.

In the bibliography relevant to the eastern Atlantic (NICKLES, 1950; NORDSIECK, 1968; PARENZAN, 1970; COSEL, 1982; etc.), the genus *Seila* A, Adams, 1861 appears to be represented by only two species: *Seila trilineata* (Philipi, 1836) and *Seila carinata* (E. A. Smith, 1871).

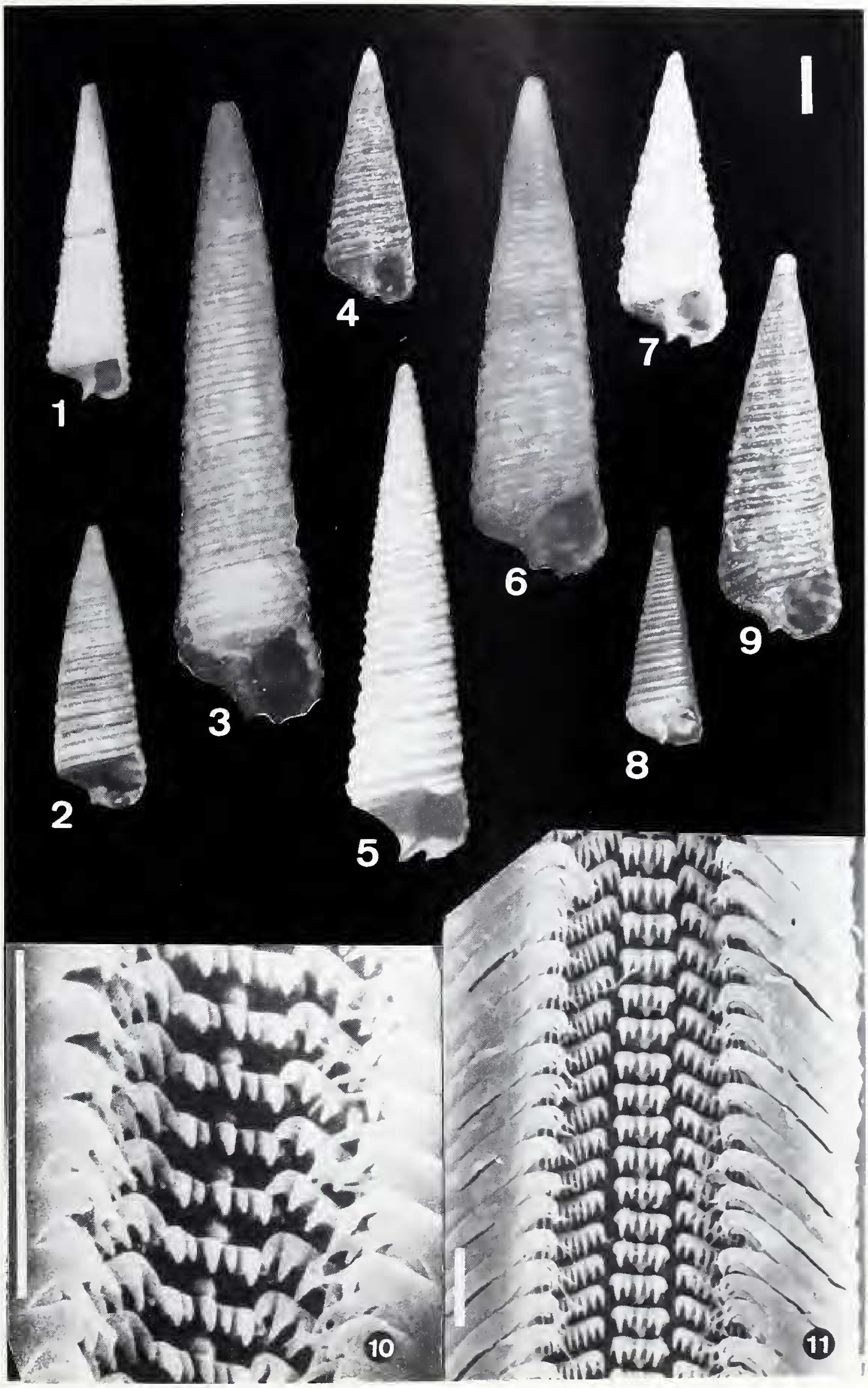
The first species seems limited to mediterranean waters and the second one to West Africa, although there is a little confusion in the citations and in the taxonomy treatment of both species. *S. trilineata* is recorded from the Mediterranean Sea in BRUSCHI *et al.* (1985), PARENZAN (1970) and NORDSIECK (1968 and 1976), though this last author mentions its occurrence in Massachusetts and the West Indies, considering that it is a synonym of *S. terebralis* (C. B. Adams, 1840, non Lamarck, 1804); but the latter taxon, as says ABBOTT (1974), is a synonym of *S. adamsi* (H. C. Lea, 1845). Nevertheless, there are three mentions of *S. trilineata* from Cape Verde: the first one is by DAUTZENBERG & FISCHER (1906) and the two other ones, more recently, are by GARCIA-TALAVERA & BACALLADO (1979) and VON COSEL (1982) (the last one reporting the record from DAUTZENBERG & FISCHER, 1906).

The second species (*S. carinata*) is mentioned in the descriptive work (SMITH, 1871) for Ouidah on the coast of Dahomey (now Benin) and later in DAUTZENBERG (1912) (Mission Gruvel). NICKLES (1950) mentions its presence from Mauritania to Benin. For GARCIA-TALAVERA (1981), the species *S. adamsi* occurs on both sides of the Atlantic Ocean and is a synonym of *S. carinata*. According to VON COSEL (1982), this species lives in the Cape Verde Islands but is not considered a synonym of *S. adamsi* which is mentioned as the representative of the genus in the Caribbean. Finally, GOFAS *et al.* (1985) also cite *S. carinata*, plus two *Seila* spp., for the angolan coasts.

Thus, it can be deduced that there is some confusion in the synonymy and in the determination of the species. It probably, is due to the fact that these shells are of small size and have frequently a broken protoconch, eroded or covered by calcareous concretions, making difficult their proper identification; in these cases, faced with similar shells, the authors identified material by referring to the geographically most known species and they put in synonymy different taxa because their teleoconchs show no evident morphological differences.

Concerning the american species of the genus *Seila*, according to ABBOTT (1974), there are four taxa, but only two valid species: *Seila subalbida* Dall, 1927, a deep-water species collected in 290 fathoms and *Seila adamsi* (H. C. Lea, 1845), found in shallow water at 40 fathoms (WARMKE & ABBOTT, 1961), which is considered a rather common species (JONG & COOMANS, 1988). According to ABBOTT (1974), *S. terebralis* (C. B. Adams, 1840) (non Lamarck, 1804) and *S. terebellum* C. B. Adams, 1847 (non Brown, 1831) are synonyms of *S. adamsi.*

During collecting field trips made by the authors in the last eleven years, specimens of *Seila* have been collected in several localities of the African coast.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Protoconchs and operculum

fig. 12. *S. adamsi* (H. C. Lea, 1845). (CER). Cayo Cantiles. Cuba.
fig. 13. *S. angolensis* n. sp. Paratype (MCNM). Corimba (Luanda) -20 m. Angola.
fig. 14. *S.* cf. *angolensis.* (CER). Chapeu Armado. Intertidal. Angola.
fig. 15. *S. carquejai* n. sp. Holotype (MCNM). Baía das Pipas. Intertidal. Angola.
fig. 16. *S. inchoata* n. sp. Paratype (CER). Sal-Rei, Boavista -5 m. Republica de Cabo Verde.
fig. 17. *S. deaurata* n. sp. Holotype (MCNM). Luanda -60 m. (Angola).
fig. 18. *S. parilis* n. sp. Holotype (MCNM). Esprainha -3 m. São Tomé I.
fig. 19. Operculum of *S. angolensis* n. sp. Luanda.

(scale bar: 0.1 mm)

Careful examination of these specimens could lead to the conclusion that there are several different species for the eastern Atlantic. These differences, not always very obvious when examining the adult shell, become clear when other characteristics such as the animal, the radula and, above all, the protoconch are compared.

SYSTEMATIC PART

Abbreviations used:

MCNM- Museo Nacional de Ciencias Naturales (Madrid).
CZL- Centro de Zoologia (Lisboa).
MNHN- Museum National d'Histoire Naturelle (Paris).
MIST- Museo Insular of Santa Cruz de Tenerife.
BMNH- British Museum (Natural History) (London).
AMNH- American Museum of Natural History (New York).
CFF- Collection of F. Fernandes.
CER- Collection of E. Rolán.

The species before known from the Atlantic waters are:

Seila trilineata (Philippi, 1836)
(fig. 22)

Material examined:
Italy: Some shells and protoconchs from sediments dredged in 30 metres near Correnti Island in Sicily (leg. Rubio Salazar).

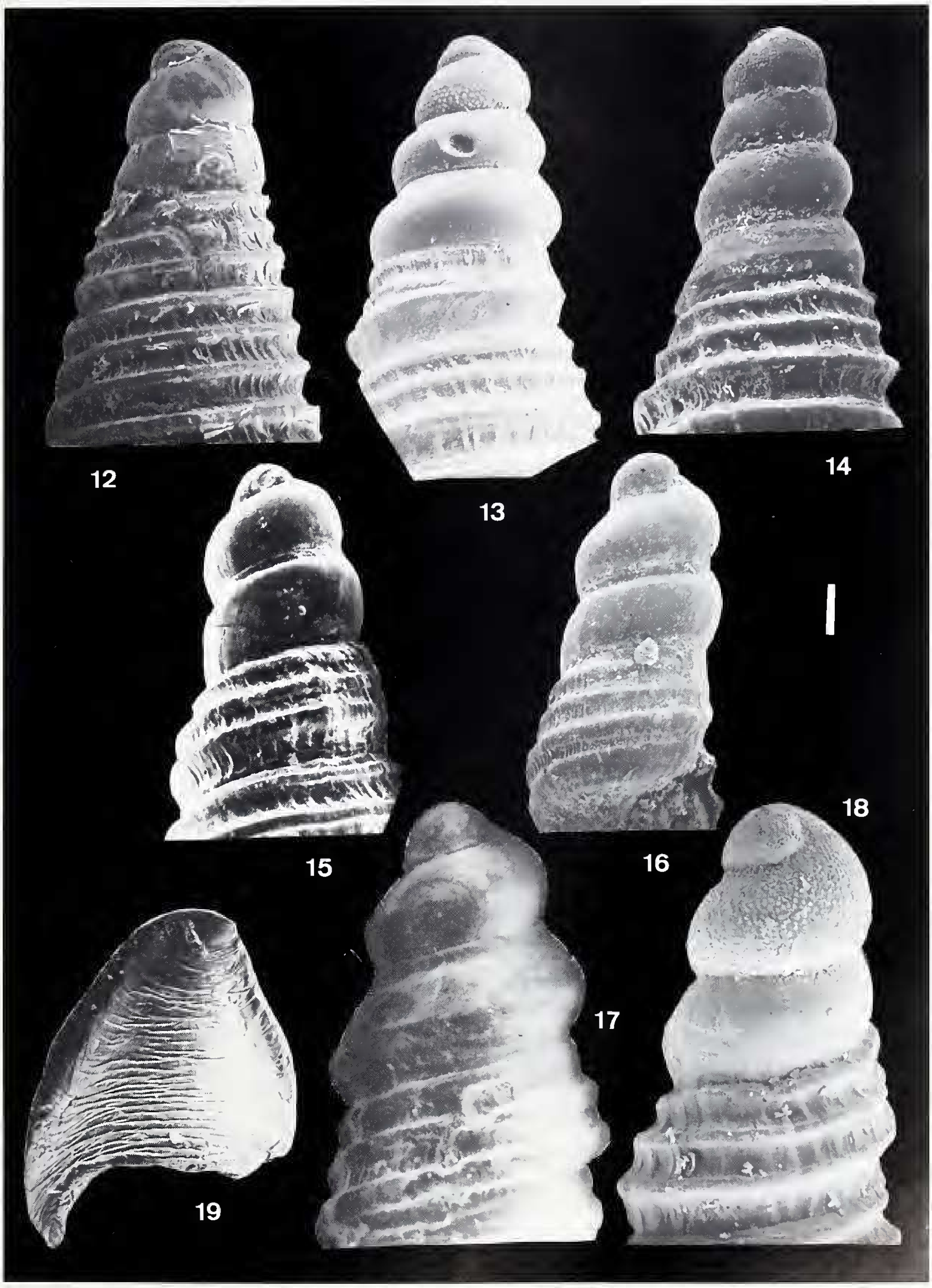
Type locality.
Pantelleria I. near Sicily (Italy).

Description.
We were unable to examine the type of this species, which was described from the Mediterranean Sea. The shells from our material have a brown teleoconch with three similar cords separated by two interspaces, also equal, and in which there are very close lamellous axial lines. The suture has very close to the lower cord and it is simple, lacking the very small cord present in other species. The two whorls of the protoconch are brown, very convex and smooth; in the suture there is a trace of a cord (fig. 22). At the beginning of the teleoconch appear the two lower cords, while the upper one appears near the suture half a whorl later. All these characteristics permit differenciation of the present species from *S. adamsi* (H. C. Lea, 1845) and *S. carinata* (E. A. Smith, 1871), as will be commented on later.

Having a short protoconch, this species probably has a limited distribution range (endemic of the Mediterranean Sea?), with no relationship with west african species. There are isolated quotations from Cape Verde Islands (DAUTZENBERG & FISCHER, 1906 and GARCIA-TALAVERA & BACALLADO, 1979) but they are not correct and will be commented later.

Seila carinata (E. A. Smith, 1871)
(fig. 1 and 20)

Material examined:
The holotype (BMNH, n^0 1870.1.12.24).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Type locality.
Ouidah (Dahomey, now Benin).

The holotype of *Cerithium (Cerithiopsis) carinatum* Smith (fig.1) is a straight and long shell with a broken protoconch and a fracture in the middle of its teleoconch. A clear definition of this taxon is necessary for comparison with other specimens; therefore, a redescription of the holotype is necessary:

Total length (without the lost first whorls of the protoconch): 5,8 mm; width of the last whorl: 1,5 mm. The teleoconch colour (possibly faded) is white, but with magnification, a light brown colour with white blotches can be observed. The protoconch is broken but the shell still has three complete smooth whorls which slowly decrease in width (fig. 20). It permits us to suppose that the complete shell could have had a spire of four whorls, or even more. At the end of the protoconch, the teleoconch begins with a cord in the middle of the whorl; the second cord appears above the first, and the third one in a subsutural position above the two first. The teleoconch, broken in the middle, has eleven spiral whorls. Each has three spiral cords of which the two upper ones are close to each other, while the third is a little distant from the second and is also more prominent; a fourth cord appears in the suture near the third whorl of the teleoconch and it increases a little on the last whorls but it never reaches the size of the first cord. On the last whorl are five cords; the fourth is at the level of the suture and the fifth a little below. A trace of a cord appears on the base of the siphonal canal. In the spaces between cords, there are axial striae, which are vertical between the second and third cords, and oblique, although in different orientation, between the first and the second ones and between the third and the fourth ones. The siphonal canal is short and open. Its extremity is at the same level as the last spiral whorl. The aperture is ovoid, a little rectangular and its free edge is sharp.

This species is different from *S. trilineata*, which has a uniform coloration, is wider and has only three equal cords on each whorl, separated by equal spaces, and which has a protoconch with only two spiral whorls.

Seila adamsi (H. C. Lea, 1845)
(fig. 2 and 12)

Material examined:
Cuba: material collected in the two Expediciones Hispanocubanas of 1984 and 1988: 8 shells from Cayo Cantiles; 3 from Cayo Diego Perez; 5 from Punta Francés (all in MCNM). 4 from Jibacoa; 3 from La Habana (CER). 10 from Cienfuegos (Coll. Fernandez Garcés, Cuba).

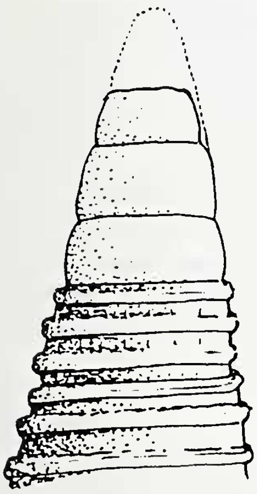
Description.
This species can be described as follows: the teleoconch is brown with indistinct lighter blotches; the sutural part is darker and sometimes it seems that the shell is striped. There are three spiral cords at the beginning, very similar and regularly spaced (fig. 2 and fig. 12). A fourth cord appears between the third and the fourth whorl, becoming more evident on the next whorls but it does not reach the size of the superior cord, except on the last whorl. Below these four cords appears a fifth one on the base. This is concave and smooth and there is a short siphonal canal. Its aperture is ovoid, a little angular at the periphery, and has a sharp external edge.

The protoconch has between two and two and a half whorls, is smooth, with the spire few extended and has a simple and shallow suture. It ends rather abruptly in the teleoconch where the three spiral cords appear simultaneously.

The animal is a translucent white with very small white spots distributed everywhere on the body and tentacles. Its operculum is curved and of a light brown colour.

The radula has been described by BANDEL (1984, plate 5 fig. 1 and 5).

Remarks.
S. adamsi differs from *S. trilineata*, which has a protoconch with more convex whorls and with a trace of a cord near the suture; it also has a teleoconch of more uniform colour and lacks the small cord in the suture. *S. carinata* has a slender shell with irregular blotches, cords of different size and irregularly spaced. Its protoconch has more whorls and, at the



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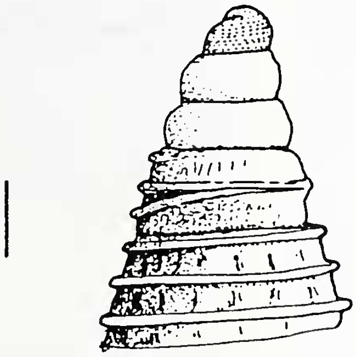

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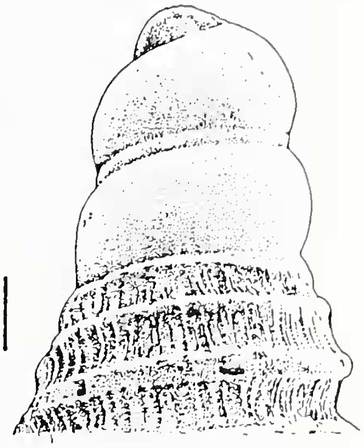

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Fig. 20. Protoconch of *S. carinata* (E. A. Smith, 1971). Holotype.
Fig. 21. Protoconch of *S. angolensis* n. sp. Holotype.(scale bar: 0,2 mm)
Fig. 1. Protoconch of *S. trilineata* (Philippi, 1836). Specimen from Sicilia I. (Italia) (scale bar: 0,1 mm)

beginning of the teleoconch, there is a single spiral cord.

The species found in the different localities of the West African coasts and which do not correspond to the description of the taxa mentioned above are considered new and are described hereunder:

Seila angolensis n. sp.

(fig. 3, 4, 11, 13, 14 and 21)

Material examined.
Angola: Several hundred specimens collected between intertidal level and 20 metres: Luanda (MNHN leg. Gofas, CFF and CER) and in the South: Mossamedes, Santa Maria and Chapeu Armado (MNHN leg. Gofas, CFF and CER).

Type locality.
The type locality is designated the Corimba Bay in Luanda.

Description.
Shell small, very slender, whorls flat-sided. Sculpture with three strong spiral cords. Colour dark or very dark brown, never light, appearing uniform at first sight.

Protoconch of lighter colour, transparent, with little more than three whorls of spire, convex, (fig. 13) and with an imprecise end. The suture is well marked and there is a small stria on it. The first whorl is small and, under magnification, it shows very small tubercles disposed in files. The second and the third whorls are a little bigger and do not show tubercles. At the end of these three whorls appears a cord in the convexity which is soon duplicated; at the same time, the colour turns brown, typical of the teleoconch, and axial striae appear, having the aspect of growth-lines. A little further, begins the third cord which is subsutural. There is not a clear beginning of the teleoconch. Half a whorl behind of the three and a quarter whorls of the protoconch, there are already three spiral cords.

The teleoconch can attain 15 whorls of spire. The first ones show three spiral cords. After the sixth or seventh whorl there appears in the suture a new thinner cord that continues to the end of the shell, increasing slowly in size but being always a little smaller than the other ones and maintaining its suprasutural position. The space between the first and second cord is narrower than the one between the second and third cord. The uniform brown colour is present on the first 5-7 whorls, but on the last whorls appear light blotches aligned in an axial direction and which can be clearly observed on the cords. Within the spaces between the spiral cords, there are axial strias, which are vertical between the second and third cords and a little oblique above (between the first and second cord) and below (between the third and fourth) but in a different sense.

Dimensions: The adult specimens studied reach between 9 and 12 mm. Most of the biggest specimens have lost their protoconch by erosion.

The animal body is whitish, a little translucent, with a large quantity of milk white spots regularly distributed. Between the tentacles, there is an orange or light brown spotted area extending towards the dorsum and around the eyes and, sometimes, reaching the proximity of the operculum. This operculum (fig. 19) is thick, corneus, of yellow colour, triangular in shape and curved.

The radula has the typical aspect of the genus (fig. 11), with a central tooth with five pointed cuspids from which the central and the most external ones are the most prominent. The lateral tooth has around 10 very similar pointed cuspids. The marginal tooth is long and has its free extremity curved with three appendices: one of them is filiform, another one is pointed and curved over the third one, which is shorter and with a digitiform profile.

Type material.
Holotype, with a length of 9,4 mm and a width of the last whorl of 2,3 mm, and 13 whorls of teleoconch. It is deposited in the MCNM with the number 15.05/1068. Paratypes in MCNM, CZL, BMNH, AMNH, MIST, MNHN, CFF and CER.

Distribution area.
The present species has been collected on all the Angolan coasts.

Habitat.
It was found in crevices in rocks and under rocks and bivalves (*Arca* sp.), with small algae and sponges, dredged from 20 metres deep up to the intertidal zone.

Etymology.
The specific name is derived from the country where the species was found: Angola.

Discussion.
Seila angolensis n. sp. is different from *S. adamsi* which has a protoconch with less than three whorls, without tubercles on the first one and lacks the stria on the suture; the colour of the animal is different and the radula has a central tooth with very irregular cuspids. *S. carinata* has a slender shell and, with the same size or with the same number of whorls, its width is almost half that of *S. angolensis*. Moreover, the protoconch of *S. carinata*, though broken is wider and has more spiral whorls (fig. 20 and 21). *S. trilineata* shows spiral cords and very regular and similar spaces between them; its protoconch has only two spiral whorls. The differences with the other species that are described in the present work are shown in Table I and will be commented on the general discussion.

Comments.
After comparative examination of the specimens collected in different places, it was noticed that there were some shells with slightly different shapes: one of them corresponds to the typical form: specimens of Corimba Bay fig. 3) in Luanda, dredged around 20 metres deep, have a more extended shell, not so dark (especially on its last whorls) and a little straighter; another form is represented by the specimens collected in Buraco (around 35 Km south of Luanda), in shallow water, which are smaller and darker (fig. 4) though they have a similar protoconch; finally, in South Angola, the shells can reach great size and are wider and darker (fig. 6) such as

some collected in Santa Maria and Chapeu Armado. Examination of the protoconch of these last shells showed close similarity with those of the type locality, with the only exception that the tubercles of the first whorl are more numerous and more densely spaced than on specimens from Luanda. These differences were not considered important enough to account for separate species. The detailed evaluation of these peculiarities will be examined in a later study.

Seila parilis n. sp.
(fig. 9, 10 and 18)

Material examined:
São Tomé: Esprainha: Thirty four specimens collected alive by F. Fernandes; two fragments in sediments.

Type locality.
Esprainha, São Tomé Island.

Distribution.
The species is known only from São Tomé Island; it is, probably, endemic to this island.

Description.
Shell small, very slender, whorls flat-sided, with three strong cords (fig. 9), appearing dark brown at first sight

Protoconch (fig. 18) with little more than two whorls, relatively broad (0,4 mm), with its first whorl covered with small tubercles, and its second one smooth or with smaller and more isolated tubercles.

Teleoconch dark brown but showing under magnification small light blotches on the spiral cords (plate I fig. 9). The whorls are from nine to eleven, increasing slowly in size; the suture is inconspicuous. Three smooth spiral cords run all over the shell, the lowest of them being a little more prominent. On the fourth or fifth whorl appears a fourth cord on the suture, that never becomes as big as the preceding ones; on the last whorl are five spiral cords. In the interspaces, axial flakes are visible. The aperture is rectangular with the external edge sharp and undulating at the ends of the spiral cords. The siphonal canal is open and short.

Dimensions:
The specimens studied have their maximum dimensions between 6 and 8 mm.

The animal was not observed.

The radula (fig. 10) is similar in aspect to the one described for *S. angolensis*.

Type material.
The holotype is a shell with eleven spiral whorls, 7 mm in length and 2 mm in width at the last whorl. It is deposited in the MCNM with the number 15.05/1069. Paratypes are in CZL, MNHN, CFF and CER.

Distribution.
Only known from São Tomé Island.

Habitat.
S. parilis n. sp. was found on stones (by brushing) from 2 to 4 m depth.

Etymology.
The specific name derives from the latin word *parilis* that means similar, alike, paying attention to the close similarity that this species has with the others of the genus.

Discussion.
Seila parilis n. sp. is different from *S. trilineata* because the latter species has a more uniform colour, its protoconch has a small stria on the suture and there are two cords at the beginning of its teleoconch. *S. carinata* is more slender and elongated and it has a protoconch with more whorls; the spiral cords of the teleoconch and the interspaces are different. *S. adamsi* lacks the tubercles on the protoconch and it is also smaller; the central tooth of the radula is very different, with more pointed cuspids. *S. angolensis* has a protoconch with more whorls, a smaller nucleus and has a single cord (instead of the three simultaneously) at the beginning of the teleoconch.

	PROTOCONCH					
	number of whorls	suture	tubercles	nucleus	position of the nucleus	cords at beginning of teleoconch
S. trilineata	2	stria suprasutural	no	smooth	normal	2
S. adamsi	2 1/4	simple	no	irregular	normal	3
S. carinata	4 ?	simple	?	?	?	1
S. angolensis	3 1/4	stria suprasutural	yes	smooth	a little high	1
S. parilis	2	simple	yes	smooth	high	3
S. inchoata	2 1/4	canal subsutural	no	smooth	high	2
S. deaurata	2	simple	no	smooth	high	1
S. carquejai	2 1/2	canal subsutural	no	irregular	high	3

Table I. Schematic comparison of the characters of the protoconch and teleoconch in the species of the genus *Seila*.

Seila inchoata n. sp.
(fig. 8 and 16)

Material examined:
Cape Verde Islands: 1 shell from Sal-Rei (Boavista Island); 1 shell and some fragments from Porto Mindelo (San Vicente Island); many fragments, most of them with the protoconch in perfect conditions, from Rabo de Junco and Monte de Leste (Sal Island). All found in sediments (leg. E. Rolán).

Type locality.
Boavista Island (Cape Verde Archipelago).

Description.
Shell small, slender, whorls flat-sided with three strong cords (plate I fig. 8), and dark brown at first sight.

The protoconch (plate II fig. 16) has two and a quarter whorls, sometimes a little more, attaining in some specimens two and a half whorls. It is not very wide (0,3 mm), totally smooth and light in colour.

	TELEOCONCH			
	colour	number of whorls	spiral cords	interspaces
S. trilineata	brown	9	similar	almost similar
S. adamsi	brown	9	similar	similar
S. carinata	brown and cream	11	third is more prominent	very different
S. angolensis	brown	15	third is more prominent	a little different
S. parilis	dark brown	11	almost similar	similar
S. inchoata	brown	10 ?	similar	similar
S. deaurata	cream	13	similar	similar
S. carquejai	cream and reddish	7	similar	similar

Table I (continued). Schematic comparison of the characters of the protoconch and teleoconch in the species of the genus *Seila*.

The suture is deep and, below it there is a shallow channel on the upper part of the whorl. The protoconch is continued by the teleoconch, beginning with three cords simultaneously, the upper one being thinner.

Teleoconch with 7 to 10 whorls of uniform brown colour, sometimes with lighter blotches. The whorls are flat and slowly increasing in size; the suture is imperceptible. Three smooth spiral cords run all over the shell and they are practically equal in size. From the second or the third whorl forward appears a fourth cord, situated immediatly near the suture and smaller than the preceding ones. The interspaces between these cords are also similar and small axial strias a little separated can be seen. On the last whorl are five cords. The base is smooth. The aperture is rectangular with a sharp external edge, and it is undulating with the extremity of the spiral cords. The siphonal canal is open and short.

Dimensions: Because most of the specimens studied were incomplete or not totally developed, the real dimensions of the species can only be approximated. The biggest fragments studied have a maximum dimension of 8 mm.

The animal is unknown.

Type material.
The holotype is a shell with a perfect protoconch and a fragment of the teleoconch with 8 whorls, metallized, with a maximum dimension of 4,3 mm, and 1,4 mm wide at the last whorl. It is deposited in the MCNM with the number 15.05/1070. Paratypes of similar characteristics are in CZL, CFF and CER.

Distribution.
Some fragments has been collected in sediments dredged in Porto Mindelo (San Vicente Island), Sal-Rei (Boavista Island) and Rabo de Junco (Sal Island).

Because of its short protoconch and broad nucleus, it is supposed that *S. inchoata* n. sp. has an intracapsular development and is, probably, endemic to the archipelago.

Etymology.
The specific name derives from the latin word *inchoatum* which means begun, commenced, because the study started with this species, showing the differences among the African species of the genus *Seila*.

Discussion.
S. adamsi is different because its protoconch is smaller, less elevated, and its nucleus is less prominent, presenting an initial differentiated area; also it lacks the subsutural excavation on the protoconch. *S. trilineata* has a smaller protoconch with a stria in the suture and lacks the subsutural excavation; moreover, in the teleoconch there is a fourth small cord near the suture. *S. carinata* has a protoconch with more whorls and the spiral cords of the teleoconch and their interspaces are different. *S. angolensis* n. sp. is a bigger shell, with spiral cords and different interspaces and its protoconch has more whorls and tubercles in the first one. *S. parilis* n. sp. has a darker shell and its protoconch has a simple suture and many tubercles on the first whorl.

Comments.
SAUNDERS (1977) mentions a *Bittium* sp. in the material collected in the Cape Verde Islands. The examination of many thousand of micromolluscs collected alive and from sediments during several years from many localities never showed to the authors one specimen of this genus. So, the *Bittium* sp. mentioned could have been a *Seila* in bad condition and difficult to be identified.

No other species of *Seila* was collected in the Cape Verde Is., except the species now described; so, the citations for the archipelago of *S. trilineata* and *S. carinata* must be put in doubt and are probably, referable to *S. inchoata*.

Seila deaurata n. sp.
(fig. 5 and 17)

Material examined.
Angola (Luanda): 1 specimen collected alive in 100 metres (leg. F. Fernandes); four immature ones collected in 60-100 metres (MNHN, leg. Gofas); seven fragments of shells with protoconch in sediments dredged in 100 metres (leg. F. Fernandes).

Type locality.
Luanda is designated type locality.

Description.
Shell small, very slender, whorls flat-sided, with three strong cords (fig. 5), cream or light brown coloured at first sight.

Protoconch (fig. 17) white, two whorls and a nucleus with a diameter of 0,17 mm. On its first whorl appears a spiral angle at the periphery. The protoconch's end is not well defined: the periphery angle descends to form the lower cord of the teleoconch, the other two appearing later.

Teleoconch cream or uniform light brown but, under magnification, on this cream colour, small reddish blotches can be seen axially; on the spiral cords these blotches give the impression of a chain-stitch. The whorls are flat, increasing slowly in size.

Their number can reach up to thirteen. The suture is inconspicuous. Three strong smooth cords run all over the shell and after the sixth or seventh whorl, a new cord appears in the suture, in a suprasutural position; it increases slowly in size but it never becomes as big as the three preceding ones. On the last whorl are five cords and a trace of a new one on the base of the siphon. In the interspaces, there are very constant small axial strias. The base is smooth. The aperture is rectangular with the external edge sharp and a little undulating because of the extremity of the spiral cords. The siphonal canal is short and widely open.

Dimensions: The single perfect specimen collected had a maximum dimension of 9,3 mm.

Animal unknown.

Type material.
Holotype (fig. 5) with 9,3 mm deposited in MCNM with the number 15.05/1071. Paratypes in MNHN, CFF and CER.

Distribution.
S. deaurata n. sp. has only been collected by dredging in Luanda (Angola).

Habitat.
S. deaurata n. sp. was found on a sea bottom of rocks and shells at 60-120 metres deep.

Etymology.
The specific name is derived from the latin word *deauratus*, evoking the light colour of the shell.

Discussion.
By its light colour (cream with reddish blotches), it is different from any of the species mentioned previously. Also, it is larger than any other, except *S. angolensis* n. sp. Another important difference is the spiral angle of the protoconch which is not present in any of the other *Seila* species, except also the last whorl of the protoconch of *S. angolensis*; but this last species has a very different protoconch and lives sympatrically.

Seila carquejai n. sp.
(fig. 7 and 15)

Material examined.
Angola (Baía das Pipas): Sixty two specimens collected alive (MNHN leg. Gofas and coll. F. Fernandes).

Description.
Shell light, small, slender, with flat-sided whorls (fig. 7).

Protoconch (fig. 15) with two and a half whorls, sometimes a little more, relatively broad, with a nucleus irregular at the beginning and with a diameter of 0,17 mm; the diameter of the first whorl is 0,30 mm. This first whorl is sometimes (but not always) a little more prominent than the second. The suture is a little deep and there is a depression under it. It has a brillant brown colour and lacks sculpture except the nucleus. The three spiral cords appear abruptly at the beginning of the teleoconch.

The teleoconch is slender with about six whorls increasing in size a little more quickly than the species mentioned before (fig. 7); flat profile, inconspicuous suture; under magnification, may be seen the colour darker on the protoconch, on the first whorls of the teleoconch and on the base; on the rest of the shell, the colour is cream or very light brown with long darker axial blotches. Three spiral cords run all over the shell; they are smooth and have the same cream colour with blotches. These cords are practically similar in size and equally prominent, with interspaces also equal. On the second or third whorl appears another cord, smaller, placed above the suture. Axial striae, a little separated, are present in these interspaces. There are five cords on the last whorls. The base is smooth and brown. The aperture is rectangular, with a free edge sharp and a little undulating because of the extremity of the spiral cords.

Animal unknown.

Type material.
Holotype with a teleoconch of six whorls and 4,2 mm in maximum dimension and at last whorl 1,7 mm wide; it is deposited in the MCNM with the number

15.05/1072. Paratypes are in the following collections: CZL, BMNH, MNHN, AMNH, CFF y CER.

Distribution. Type locality.

Seila carquejai n. sp. has been collected in Baía das Pipas in the South of Angola, this bay being designated as type locality.

Habitat.

The specimens were found under rocks in the intertidal zone.

Etymology.

The specific name is dedicated to Mario Albano dos Santos "Carqueja", diver and fishing businessman who has helped on many occasions at sea as well as on land and cooperated in the study of the angolan molluscs.

Discussion.

S. carquejai n. sp. is different from *S. carinata* which is more slender and straight and has a protoconch with more whorls. *S. adamsi* has a darker colour and its protoconch is shorter and with a simple suture. *S. trilineata* has a shorter protoconch with a different suture and two cords at the beginning of the teleoconch which has only three cords on each whorl. *S. angolensis* n. sp. is bigger and longer and its protoconch has more than three whorls, with tubercles on the first one. *S. inchoata* n. sp. has a darker teleoconch and its protoconch is lighter with a smooth nucleus. *S. parilis* n. sp. has also a darker teleoconch and its protoconch has tubercles and a simple suture. *S. deaurata* n. sp. has a teleoconch of lighter colour, with a slender profile; its protoconch is white and has a peripheric angle.

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BIBLIOGRAPHY.

ABBOTT, R. T. 1974. *American seashells.* 2^{nd} edition. Van Nostrand Reinhold Comp. New York. 663 pp.

BANDEL, K. 1984. The radulae of caribbean and other Mesogastropoda and Neogastropoda. *Zoologische Verhandelingen*, (214) : 1-188, 22 pls.

BRUSCHI, A., I. CEPPODOMO, C. GALLI, & P. PIANI, 1985. *Catalogo dei molluschi conchiferi viventi nel mediterraneo.* Enea. Bologna. 111 pp.

COSEL, R. von. 1982. Marine mollusken der Kapverdischen Inseln. *Cour. Forsch.-Inst. Senckenberg*, **52** : 35-76.

DAUTZENBERG, Ph. 1912. Mission Gruvel sur la Côte Occidentale d'Afrique (1909-1910). *Ann. Inst. Ocea.*, 5 fasc. 3 :1-111, 3 pls.

DAUTZENBERG, Ph. & H. FISCHER, 1906. Mollusques provenant des dragages effectués a l'ouest de l'Afrique pendant les campagnes de S. A. S. le Prince de Monaco. *Rés. Camp. Sci. Albert I Monaco*, 32 : 1-125, 5 pls.

GARCIA-TALAVERA, F. 1981. *Los moluscos gasterópodos anfiatlánticos.* Univ. La Laguna. Col. Monografias, n° 10. 352 pp, 7 pls.

GARCIA-TALAVERA, F. & J. J. BACALLADO, 1979. Nuevas aportaciones a la fauna de Gasterópodos marinos (Mollusca, Gastropoda) de las Islas de Cabo Verde. *Bol. Inst. Esp. Oceano.*, **6** (328) : 202-208.

GOFAS, S., J. PINTO AFONSO & M. BRANDAO, 1985. *Conchas e moluscos de Angola. Universidade Agostinho Neto* / Elf Aquitaine Angola. 144 pp.

NICKLES, M. 1950. *Mollusques testacès marins de la Cote Occidentale d'Afrique.* Lechevalier. Paris. 269 pp.

NORDSIECK, F. 1968. *Die europäischen Meeres-Gehäuseschnecken (Prosobranchia).* G. Fischer Verlag. Stuttgart. 273 pp.

NORDSIECK, F. 1976. The genus *Cerithiopsis* Forbes & Hanley, 1849 in the European Seas. *La Conchiglia*, **8** (85-86) : 6-7, & 18.

PARENZAN, P. 1970. *Carta d'identitá delle conchiglie del Mediterraneo. I.* E. Bios Taras. Taranto. 283 pp.

SAUNDERS, G. D. 1977. Some notes on shelling in the Cape Verde Islands. *La Conchiglia*, **9** (97-98) : 3-21.